## We claim:

1	1.	A data storage device comprising:		
2		a conduction barrier;		
3		a probe tip mounted on a suspension mechanism;		
4		a voltage source coupled to the suspension mechanism for emitting a current of		
5	electi	electrons through the conduction barrier; and		
6		a sensing mechanism for sensing a magnitude of the emitted current wherein the		
7	magn	magnitude of the current of electrons is based on a distance between the probe tip and the		
8	sensi	sensing mechanism.		
1	2.	The data storage device of claim 1 wherein the sensing mechanism further		
2	comp	comprises:		
3		a conduction region coupled to the conduction barrier; and		
4		at least two electrical contacts coupled to the conduction region for monitoring the		
5	curre	nt induced in the conduction region by the current of electrons emitted from the probe		
6	tip.			
1	3.	The data storage device of claim 2 wherein the conduction region comprises a		
2	catho	odoconductive material.		
1	4.	The data storage device of claim 2 wherein the at least two electrical contacts are		
2	align	ed in a vertical fashion with respect to the conduction region.		
1	5.	The data storage device of claim 1 wherein the conduction barrier further comprises		
2	at lea	at least one layer of polymer material.		
1	6.	The data storage device of claim 5 wherein the at least one layer of polymer material		
2	comp	prises a wear resistant polymer material.		
1	7.	The data storage device of claim 5 wherein the polymer material is a topographic		
2	data	data storage medium.		
1	8.	The data storage device of claim 6 wherein the conduction barrier further comprises		

2	a seco	a second layer of material wherein the second layer of material comprises a second polymer		
3	material wherein the second polymer material is harder than the first polymer material.			
1	9.	The data storage device of claim 1 wherein the suspension mechanism and the		
2	sensing mechanism are both built onto a platform.			
1	10.	The data storage device of claim 1 further comprising:		
2		an anode coupled to the conduction barrier wherein the anode comprises a		
3	conductive layer of material; and			
4		wherein the sensing mechanism includes at least one electrical contact coupled to		
5	the anode for monitoring the magnitude of the current of electrons.			
1	11.	The data storage device of claim 1 further comprising an insulating layer as part of		
2	the conduction barrier.			
1	12.	The data storage device of claim 11 wherein the insulating layer further comprises		
2	an oxide layer.			
1	13.	The data storage device of claim 1 wherein the sensing mechanism further		
2	comp	rises a charged particle detector.		
1	14.	The data storage device of claim 13 wherein the charged particle detector comprises		
2	at least one of a cathododiode, a cathodotransistor or an avalanche diode.			
1	15.	The data storage device of claim 1 wherein the voltage source is coupled to the		
2	probe tip.			
1	16.	A method of reading data in data storage device comprising:		
2		providing a conduction barrier wherein the conduction barrier includes a data		
3	storage medium;			
4		suspending a probe tip over the conduction barrier via a suspension mechanism;		
5		emitting a current of electrons through the conduction barrier from a voltage source		
6	count	ed to the suspension mechanism; and		
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7		sensing a magnitude of the current of electrons emitted from the voltage source with		
8	a sens	a sensing mechanism wherein the magnitude of the current of electrons is based on a		
9	distan	distance between the probe tip and the sensing mechanism.		
1	17.	The method of claim 16 wherein the act of sensing a magnitude of the current		
2	furthe	er comprises:		
3		coupling a conduction region to the conduction barrier; and		
4		coupling at least two electrical contacts to the conduction region for monitoring the		
5	currer	nt induced in the conduction region by the electrons emitted from the voltage source.		
1	18.	The method of claim 17 wherein the conduction region comprises a		
2	cathodoconductive material.			
1	19.	The method of claim 17 wherein coupling the at least two electrical contacts to the		
2	condu	conduction region further comprises coupling the at least two electrical contacts to the		
3	condu	action region in a vertical fashion.		
1	20.	The method of claim 16 further comprising the act of:		
2		building a conduction region into the suspension mechanism.		
1	21.	The method of claim 16 wherein the act of providing a conduction barrier further		
2 .	comp	comprises:		
3		coupling an anode to the conduction barrier wherein the anode comprises a		
4	conductive layer of material.			
1	22.	The method of claim 21 wherein the act of sensing a change in current further		
2	comp	rises:		
3		coupling at least one electrical contact to the conductive layer of material for		
4	monit	coring the current of electrons emitted from the voltage source.		
1	23.	The method of claim 16 wherein the act of providing a conduction barrier further		
2	comp	comprises:		
3		including an insulating layer in the conduction barrier.		

1	24.	The method of claim 23 wherein the insulating layer further comprises an oxide layer.		
1	25.	The method of claim 16 wherein the act of sensing a magnitude of current based on		
2	the cu	the current of electrons emitted from the voltage source with a sensing mechanism further		
3	comp	comprises:		
4		coupling a charged particle detector to the conduction barrier.		
1	26.	The method of claim 25 wherein the charged particle detector comprises at least one		
2	of a c	athododiode, a cathodotransistor or an avalanche diode.		
1	27.	A data storage system comprising:		
2		means for providing a conduction barrier wherein the conduction barrier includes a		
3	data storage medium;			
4		means for suspending a probe tip over the conduction barrier via a suspension		
5	mech	mechanism;		
6		means for emitting a current of electrons through the conduction barrier from a		
7	voltag	ge source connected to an emitting region of the suspension mechanism; and		
8		means for sensing a magnitude of the current of electrons emitted from the voltage		
9	sourc	source with a sensing mechanism wherein the magnitude of the current of electrons is based		
10	on a distance between the probe tip and the sensing mechanism.			
1	28.	A computer system comprising:		
2		a central processing unit; and		
3		a data storage device coupled to the central processing unit comprising:		
4		a conduction barrier;		
5		a probe tip mounted on a suspension mechanism;		
6		a voltage source coupled to the suspension mechanism for emitting a current of		
7	electr	electrons through the conduction barrier; and		
8		a sensing mechanism for sensing a magnitude of the emitted current wherein the		
9	magn	itude of the current of electrons is based on a distance between the probe tip and the		
10	sensii	sensing mechanism.		